Chapter 1

HISTORY

Where farmers once trudged open fields behind horse and plow now stands the nation's most powerful nuclear reactor, forging from within a uranium core, elements which exist naturally only in the stars . . .

Where sturdy, hand-hewn log cabins were once shadowed by tall native pine now stands a massive plant that produces a fuel which represents the most compact form of energy known to man . . .

Where hunters once trapped wild fox for subsistence, scientists now gather for special study a specie of wasp which seems to possess the uncanny ability of sensing nuclear radiation . . .

Where the ill were once subjected to the "curative" properties of herbs and roots, boiled over a wood-burning stove, now stands a unique hospital which treats cancer patients in an invisible "bath" of radiation.

This remarkable transformation, symbolic of the technological revolution which has given birth to the Atomic Age, occurred swiftly within a 92-square mile tract of gently rolling East Tennessee countryside. Once it was dotted with small farming communities such as Wheat and Scarboro—names of provincial importance. Today the area is called Oak Ridge—a name of international recognition which identifies one of the world's most diversified centers for nuclear research, production and education.

Why was a quite rural area straddling the Roane-Anderson County line in Tennessee chosen for such a massive, multi-billion dollar atomic energy complex? The answer lies in the events of the early 1940's when this country was secretly pushing at a frantic pace, the creation of a nuclear weapon to end World War II.

Sensing the imminent success of a select group of the nation's key nuclear scientists at the University of Chicago under the direction of Enrico Fermi, teams of

engineers embarked on a top secret mission: selection of a site on which to build huge plants for production of nuclear material for an atomic weapon. Chicago, although the principal nuclear research and experimental site at this time, was unsuitable, chiefly because of the concentration of population.

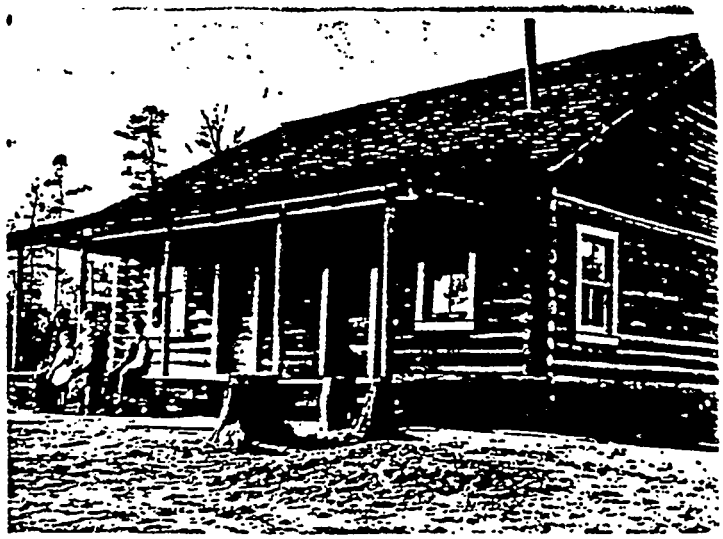
SITE SELECTED

The East Tennessee site was visited in the spring of 1942 by a three-member team. They looked carefully at the physical characteristics, they studied data on the availability of labor, transportation, water and electric power.

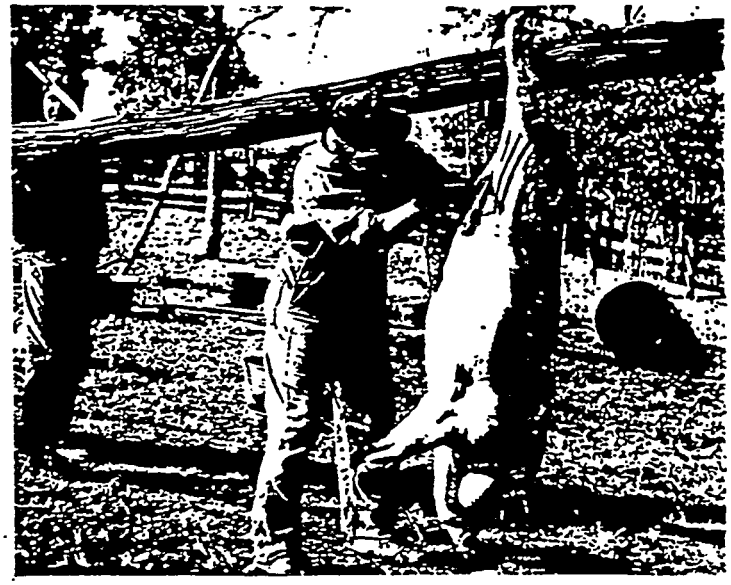
Impressed by what they saw, these notes were jotted:

"The topography is such that a number of operations could find reasonably flat areas divided by protective hills. The driving distance to Knoxville is less than 20 miles, and service from two important railroads is immediately available.

"Water from the Clinch River is regulated . . . and because of the nearby Norris Dam is relatively free of silt. A relatively small part of the land is under cultivation, indicating that a small number of families would have to be moved."



Farm homes such as this one dotted the East Tennessee countryside.



Farmers raised and slaughtered their own meat.

Leather tanning by an early Oak Ridge settler.

Children of the families living in the sparsely populated farmland area attended this community school in the Oak Ridge valley.

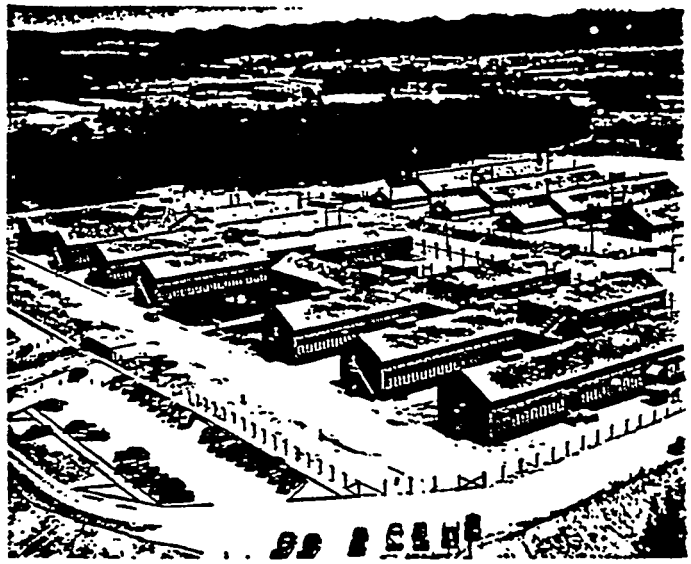
Tobacco was a predominant crop in this East Tennessee farmland area.

Y-12 BEGINS OPERATION

The Y-12 Plant began production on January 27, 1944, about a year before the gaseous diffusion operation started, and there were great pressures in 1944 to increase the output of Y-12. Uranium in nature consists of about .7 of 1 per cent U-235 and the remainder is largely the stable isotope, U-238. Any method of increasing the U-235 content, even slightly, of the material fed into Y-12 would greatly increase production.

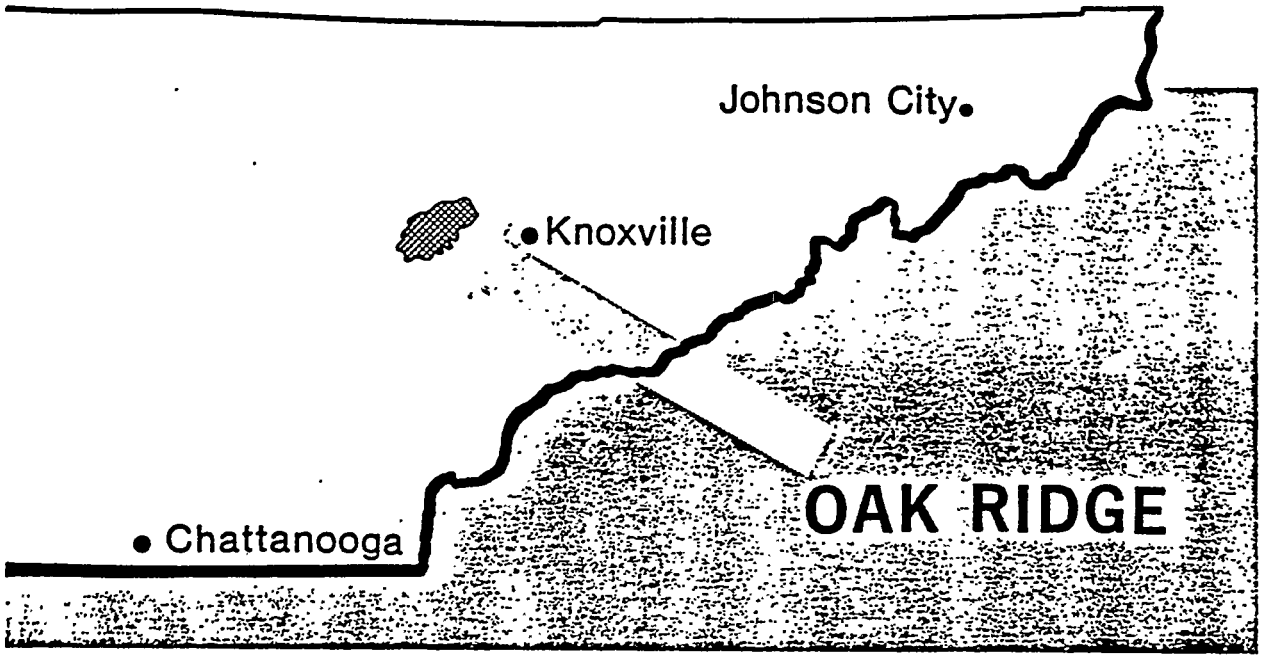
It was decided that a third method of uranium separation would be attempted, and a plant to produce slightly enriched U-235 by the thermal diffusion process was built in late 1944, in a short period of time. The product of the thermal diffusion plant was fed into Y-12, boosting production considerably.

By mid-1945, Oak Ridge had a population of 75,000, all behind security fences, and employment reached a peak of 82,000. Some people traveled from as far away as 75 miles each day to work on the project.



These were the first buildings to be erected in Oak Ridge, and they served as the Army's Manhattan Engineer District Headquarters, the nerve center for the nation's wartime atomic energy effort.

Oak Ridgers celebrate the end of World War II.



This 92-square-mile site in East Tennessee was selected as the location for a major atomic energy production complex.

By September 19, 1942, the site decision was final. And in the ensuing weeks, about 1,000 families abandoned their homes, churches, and schools, as the Army's Manhattan Engineer District acquired the land at a cost of about $2,600,000.

The area was sealed off by guards, roadblocks and fences and an area conditioned to a mundane environment was to witness a lightning-swift transformation. The din of bulldozers, steam-shovels and dump-trucks began to echo down wooded valleys accustomed only to the sounds of abundant wildlife.

Home canned foods supplied families with fruits and vegetables when fresh produce was out of season.

CONSTRUCTION BEGINS

By November, work had started on the first building in Oak Ridge, a structure to serve as headquarters for the Manhattan Engineer District and nerve center for the nation's vast wartime atomic energy effort. Almost simultaneously, work began on community facilities to house the burgeoning population.

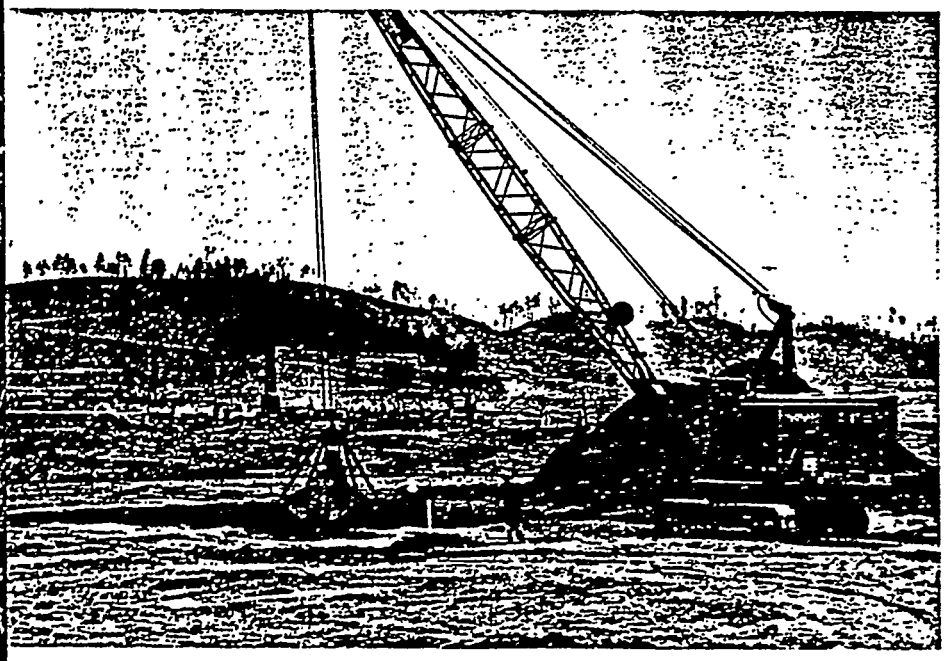
As work progressed on the community, construction started in the plant areas.

On February 1, 1943, ground was broken, by the Stone and Webster Corporation of Boston, for the first building of the electromagnetic separation plant—Y-12—where enriched uranium 235 would be produced in large quantities. Stone and Webster also held the contract for construction of the city.

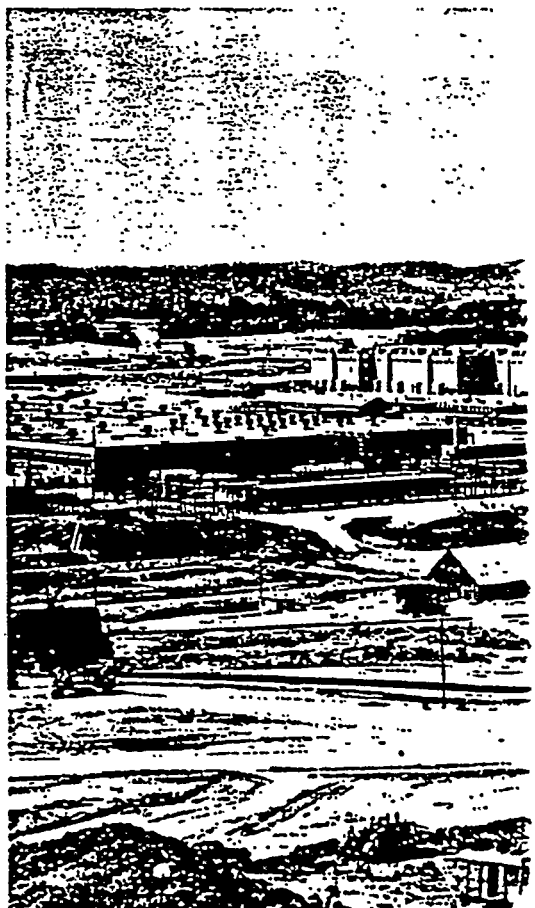
In another valley several miles away, work started simultaneously on the first facility in the X-10 area, now Oak Ridge National Laboratory. It was a nuclear reactor which would serve as a pilot plant for the large plutonium-producing reactors to be built later at Hanford, Washington. In this reactor, sufficient plutonium would be produced to provide scientists with the material necessary to develop a method for the chemical separation of this man-made element.

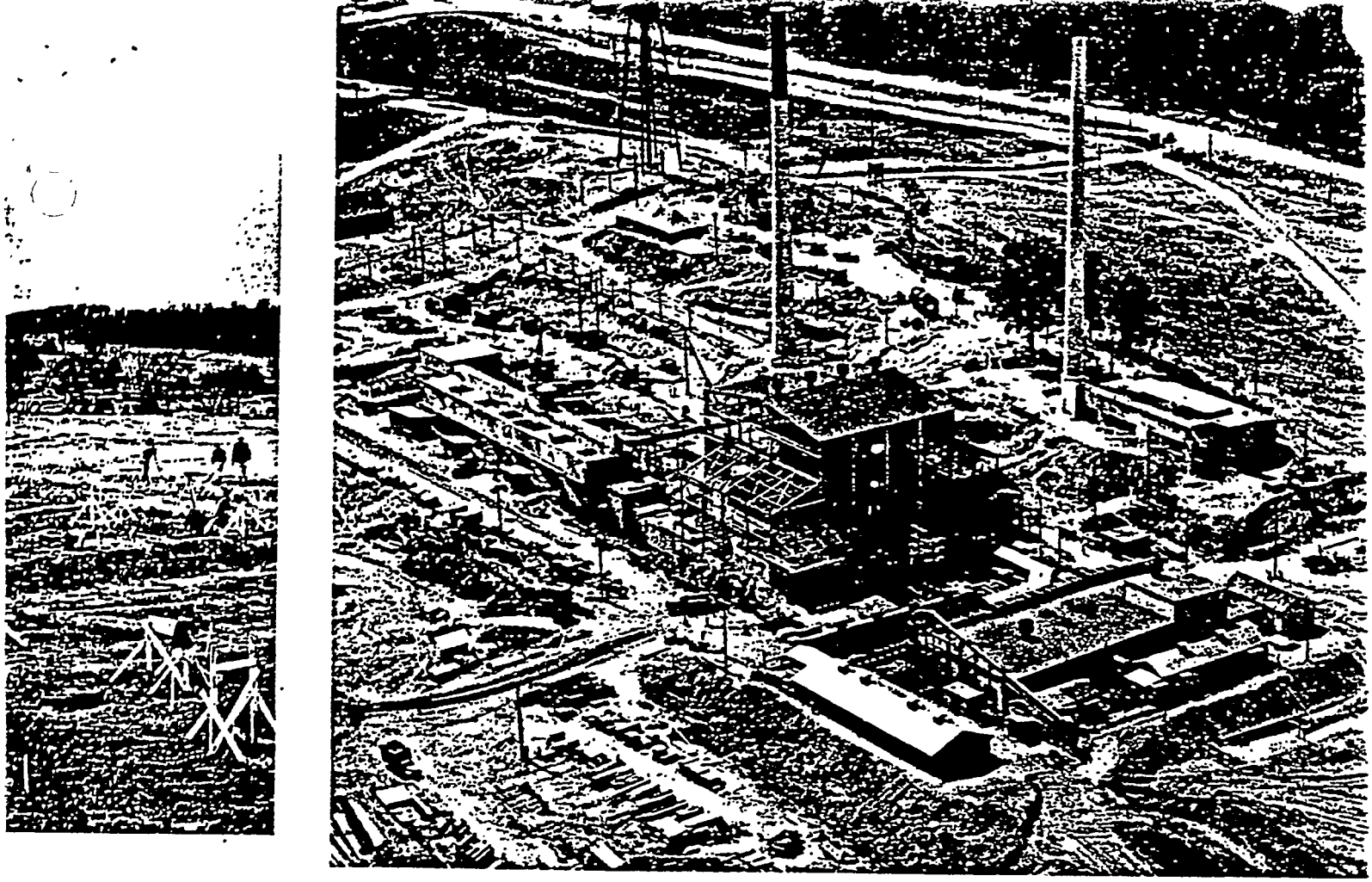
Work on the Oak Ridge Graphite Reactor began less than two months after Dr. Fermi and his colleagues at Chicago successfully operated the world's first

Construction begins in December 1942 on the first building in Oak Ridge—headquarters for the Manhattan Engineer District.

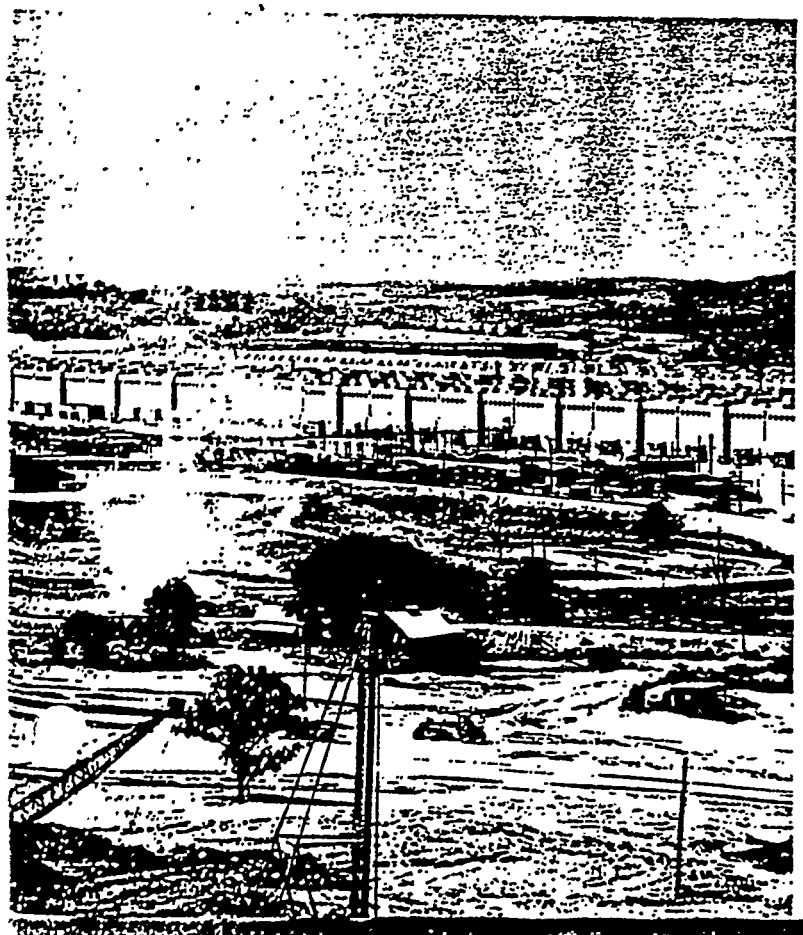


Ground is broken for the first building of the electromagnetic separation plant, known as Y-12.





The first facility in the X-10 area, the Graphite Reactor, under construction in 1943. High purity graphite for the reactor was machined in the building in the foreground.



nuclear reactor on December 2, 1942. The Oak Ridge reactor was to become the world's second; and it operated long and faithfully until 1963.

It had been determined that two methods of separating uranium 235 would be pursued—the electromagnetic process for which Y-12 was being built, and the gaseous diffusion method. On January 20. 1943, Carbide and Carbon Chemicals Company, now Union Carbide Corporation, Nuclear Division, accepted a letter of intent for operation of the gaseous diffusion plant to be built at Oak Ridge. Construction of the main gaseous diffusion building began September 10, 1943, and the plant was designated K-25.

Thus. the major Oak Ridge facilities consisted of the two uranium production plants—Y-12 and K-25—and the laboratory area known as X-10.

A wartime view of the gaseous diffusion plant in Oak Ridge while construction was still in progress.